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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,399	07/08/2004	Min-Jer Lin	LKSP0027USA	4398
27765	7590	06/09/2006	EXAMINER	
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			NGUYEN, DAO H	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 06/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/710,399

Applicant(s)

LIN, MIN-JER

Examiner

Dao H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date: _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____  | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. In response to the communications dated 03/30/2006, claims 1-12 are active in this application.

### **Remarks**

2. Applicant's argument(s), filed 03/30/2006, with respect to claims 1-12 have been fully considered, but are not persuasive.

First, Applicant is advised that argument(s) relating to subject matter not included in the claim would not be considered having patentable weight. Therefore, argument(s) that Byun et al. do not teach the solder balls along with the dummy bonding bar arranged in a line will have no patentable weight because the claim of the instant application states that a plurality of first bonding balls are positioned on the second surface of the second substrate and arranged in a line along a first direction, while the at least a dummy bonding bar is positioned on the second surface of the second substrate. According to this, only the first bonding balls are arranged in a line; the dummy bonding bar may not be necessarily arranged in the same line with the first bonding bar. Similarly, argument(s) about the size of the chip is/are not having patentable weight.

Second, argument that the dummy bonding bar, or the bonding bar, 162 of Byun does not function to prevent the semiconductor package from inclining to one side is not

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persuasive. According to Byun, the connection terminal, or the bonding bar, 162 is larger than the conventional structure, thereby improving the joining force. The connection terminal 162 between the enhanced pads 170 and the enhanced lands 180 thereby improves the solder joint reliability of the surface mount package (col. 4, lines 6-14). Since the joining force, and/or the solder joint reliability of the surface mount package are/is improved, the probability of the semiconductor package being moved off its position would definitely be less. This includes that the probability of the semiconductor package being inclined from its position would also be less; or that the probability of the semiconductor package being inclined to one side would be less.

Hence, it is inherent that the dummy bonding bar, or the bonding bar, 162 of Byun does function to prevent the semiconductor package from inclining to one side.

With regard to claim 2, fig. 5 of Byun shows that the second substrate 120 has a rectangular shape with long sides being perpendicular to the long sides of the paper sheet, and short sides being perpendicular to the short sides of the paper sheet. Fig. 5 also shows that ball pads 124 are arranged in array with a first horizontal direction being parallel to the long side of the second substrate 120.

With regard to claim 3, fig. 5 shows plurality of enhanced pads 170 (on which the bonding bars 162 being mounted (fig. 6)). Some of the enhanced pads 170 are arranged with the long sides being parallel to the long sides of the second surface of the second substrate 120; while some of the other enhanced pads 170 are arranged with

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the long sides being perpendicular to the long side of the second surface of the second substrate 120. Clearly, Byun does disclose the claimed limitations.

With regard to claim 5, figs. 6 and 8d clearly show that the bonding bar 162 does have a planar third surface connected to the first substrate 150. In addition, fig. 8c, 8d show, and col. 5, lines 14-23 teaches that the substrate 120 is formed on the board, or substrate, 150 by the solder balls 160, 162 and the solder paste 164 by a solder reflow process. Solder paste 164 is priorly formed on the substrate 150 and has planar surface. Therefore, after the reflow process, the final surface of the bonding bar 162 connected to the substrate 150 must be a planar surface. Even the final surface of the bonding bar 162 connected to the substrate 120 is a planar surface (col. 5, lines 18-23).

For the above reasons, it is believed that the rejections should be sustained and is rewritten as follows.

### **Claim Rejections - 35 U.S.C. § 103**

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**4. Claim(s) 1-12 is/are rejected under 35 U.S.C. 103 (a) as being unpatentable over U.S. Patent No. 6,736,306 to Byun et al.**

Regarding claim 1, Byun discloses a semiconductor package, as shown in figs. 1-8, which is positioned on a first substrate 150 comprising:

a second substrate 120 having a first (upper) surface and a second (lower) surface;

a chip 110 positioned on the first (upper) surface of the second substrate 120;

a plurality of first bonding balls 160 positioned on the second (lower) surface of the second substrate 120 and arranged in a line along a first direction for connecting the second substrate 120 to the first substrate 150; and

at least a bonding bar 162 positioned on the second surface of the second substrate 120 for connecting the second substrate 120 to the first substrate 150 and preventing the semiconductor package from inclining to one side (the bonding bar or connection terminal 162 is large, thereby improving the join force between the first substrate 150 and the second substrate 120, thereby improving the solder joint reliability of the surface mount package (col. 4, lines 9-26); therefore, it is inherently preventing the package from inclining to one side)). See also the above remarks.

Byun does not teach that the bonding bar 162 being a dummy bar.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made that the fact that a bonding bar being an active bar or a dummy bar merely depends on how the device being connected or used.

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Conventionally, similar bar or ball (which has smaller size) being used as dummy bar or ball (col. 4, lines 2-3). Therefore, such "dummy" limitation has no patentable weight since it makes no structural difference in the device.

Regarding claim 2, Byun discloses the semiconductor package wherein the second surface has a rectangular shape and the first direction is parallel to a long side of the second surface. See fig. 2.

Regarding claim 3, Byun discloses the semiconductor package wherein the longest side of the dummy bonding bar 170a is approximately perpendicular to the long side of the second surface for preventing the semiconductor package from inclining. See fig. 5.

Regarding claim 4, Byun does not teach that a length of a short side of the second surface is less than 1000  $\mu\text{m}$ . However, it would have been obvious to one of ordinary skills in the art that the short side of the second substrate 120 can be modified to have any suitable length, depending on the desired device, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Regarding claim 5, Byun discloses the semiconductor package wherein the dummy bonding bar has a planar third surface connected to the first substrate for preventing the semiconductor package from inclining. See fig. 4. Note that the bonding bar or connection terminal 162 is large, thereby improving the join force between the first substrate 150 and the second substrate 120, thereby improving the solder joint reliability of the surface mount package (col. 4, lines 9-26); therefore, it is inherently preventing the package from inclining to one side).

Regarding claim 6, Byun discloses the semiconductor package further comprising a plurality of first bonding pads 124, each of which being positioned between the second surface and each of the first bonding balls 160, and at least a dummy bonding pad 174 positioned between the second surface and the dummy bonding bar 162. See fig. 6.

Regarding claim 7, Byun discloses the semiconductor package further comprising a plurality of second bonding pads positioned on the second surface and a plurality of second bonding balls respectively positioned on the second bonding pads, the second bonding balls being interlaced with the first bonding balls. See figs. 4, 6.

Regarding claim 8, Byun discloses the semiconductor package wherein a height of the dummy bonding bar is the same as a height of each of the first bonding balls and the second bonding balls. See figs. 4, 6.



Regarding claims 9-10, Byun does not necessarily discuss about the materials being used for the balls, the bar, and/or the pad. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select any suitable and known material(s) for such elements, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 11, Byun discloses the semiconductor package wherein the first substrate 150 comprises a build-up printed circuit board, a co-fired ceramic substrate, a thin-film deposited substrate, or a glass substrate. See col. 3, lines 20-65.

Regarding claim 12, Byun does not explicitly teach that the chip is an image sensor chip. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made that any known chip, including an image sensor chip, can be used in the device of Byun, because none of such would make any change in the spirit and/or scope of the invention of Byun.

### **Conclusion**

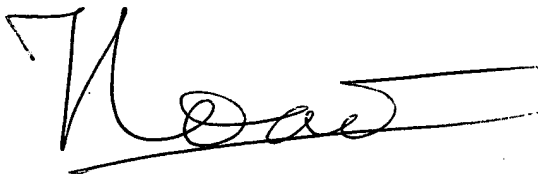
5. **THIS ACTION IS MADE FINAL.** A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the

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event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dao Nguyen whose telephone number is (571)272-1791. The examiner can normally be reached on Monday-Friday 9:00am - 6:00pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571)272-1907. The fax numbers for all communication(s) is (571)273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.

A handwritten signature in black ink, appearing to read 'Dao H. Nguyen', with a horizontal line drawn underneath the signature.

Dao H. Nguyen  
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June 2, 2006

A handwritten signature in black ink, appearing to read 'Andy Huynh', written above the printed name.

ANDY HUYNH  
PRIMARY EXAMINER